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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/708,771

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Gopal B. Avinash

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EXAMINER

VANCHY JR, MICHAEL J

ART UNIT

PAPER NUMBER

2624

NOTIFICATION DATE

DELIVERY MODE

05/08/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptopatentmail@cantorcolburn.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/708,771	<b>Applicant(s)</b> AVINASH ET AL.	
	<b>Examiner</b> MICHAEL VANCHY JR	<b>Art Unit</b> 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-27 and 29-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-12, 18-27 and 29-33 is/are allowed.
- 6) ☒ Claim(s) 1-6, 13-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed February 24, 2009 have been fully considered but they are not persuasive. Response to the arguments can be found at the end of this Office Action.
2. The Rejection made under 35 U.S.C § 101 in the previous Office Action has been withdrawn thanks to Applicant's amendments.

### *Claim Rejections - 35 USC § 103*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. **Claims 1-5, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al., 7,391,895 B2.**

**Regarding claim 1**, Wang teaches a method for processing a digital image, the method comprising: estimating a foreground region relating to an imaged object; estimating a background region relating to other than the imaged object; and by using the image, the estimated foreground region and the estimated background region, calculating a transition region disposed between the foreground region and the background region; wherein the estimated foreground region, the estimated background region, and the calculated transition region, each comprise a separate set of pixels that may each be processed separately for suppressing pixel intensities in the estimated

Art Unit: 2624

background region and improving image quality (Figs. 10(a-d) and col. 9, lines 12-32). The examiner takes into account that since each region (foreground, background, and transition) are separate it would be obvious that each set can then be processed separately to allow for pixel intensity suppression.

**Regarding claim 2**, Wang teaches a foreground region comprises defining an initial foreground region as that region containing those pixels of the image meeting a first criterion; and the estimating a background region comprises defining the background region as that region containing those pixels of the image meeting a second criterion; and the transition region is calculated by a gradient constrained hysteresis threshold method (Figs. 4(a-c), col. 4, lines 22-52, and col. 6, lines 6-27). The examiner takes into account that even though a gradient constrained hysteresis isn't explicitly stated, looking at Figures 4b and 4c it is clear to one of ordinary skill in the art, that this specific threshold can easily be created based on the information gathered by the apparatus. Thus, even though a different threshold is utilized in Wang, the one stated by the applicant can easily be implemented.

**Regarding claim 3**, Wang teaches the first criterion comprises a pixel intensity greater than a first threshold (Figs. 4(a-c), 6(a-b), col. 4, lines 22-52, and col. 6, lines 6-27).

**Regarding claim 4**, Wang teaches the second criterion comprises a pixel intensity less than a second threshold (Figs. 4(a-c), 6(a-b), col. 4, lines 22-52, and col. 6, lines 6-27).

**Regarding claim 5**, Wang teaches the calculating a transition region comprises calculating the transition region as that region containing those pixels of the image meeting a third criterion (Figs. 4(a-c), 6(a-b), col. 4, lines 22-52, and col. 6, lines 6-27).

**Regarding claim 17**, Wang teaches wherein the digital image is a digital image of a biological object obtained using x-ray imaging (col. 1, lines 36-49).

**3. Claims 6, and 13-16, are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al., 7,391,895 B2 and further in view of Hong et al., 2002/0037103.**

**Regarding claim 6**, Wang teaches the third criterion comprises: a pixel having a pixel intensity greater than the second threshold, and a gradient magnitude that is within a gradient tolerance value of the gradient magnitude of the foreground pixel (6(a-b), and col. 6, lines 6-27). The examiner takes into account that Wang does not explicitly state using a gradient tolerance value but it is obvious that with the information determined by the apparatus that one is or can be easily implemented. Wang, however does not explicitly teach a morphological connection to a foreground pixel, which Hong does ([0020]). It would be clear to one of ordinary skill in the art at the time of the invention to modify Acker to include a morphological operation/connection so that image quality is improved.

**Regarding claim 13**, Wang teaches defining an object region as the union of the initial foreground region and the initial transition region (Figs. 10(c-d)), Hong teaches using a morphological operation ([0020]).

**Regarding claim 14**, Wang teaches defining a final foreground mask as the initial foreground region; defining a final transition mask as the difference between the object region and the final foreground region; and defining a final background mask as the remainder of the image ([0020] and [0086-0088]).

**Regarding claim 15**, Wang teaches suppressing pixel intensities in the background region by gradually reducing the intensity of background pixels to zero as a function of their distance from the object region ([0020]).

**Regarding claim 16**, Wang teaches the function comprises a linear ramp function, an exponential function, a Gaussian function, a Hanning function, a Hamming function, any function for reducing a value with respect to distance, or any combination of functions comprising at least one of the foregoing functions ([0020]).

***Allowable Subject Matter***

4. Claims 7-12, 18-27, and 29-33 are allowed.

***Response to Arguments***

3. Applicant's arguments filed February 24, 2009 have been fully considered but they are not persuasive.
4. The Examiner would like to point out that the prior art of record fully encompasses the broadest interpretation of the claim language. Looking at Figs. 10a-10d of Wang (US 7,391,895 B2), there is clearly an estimated foreground and background region. There also is a transition gap, and based on the claim language in the Application the transition region is "a third set of pixels disposed between the foreground and the background region." This is explicitly displayed in Fig. 10c. The next argument by the Applicant is that the foreground, background and transition region must be separately and independently processed for suppressing pixel intensities in the estimated background region while improving image quality. The Examiner takes into account that even though the transition region is determined by comparing the foreground and the background pixels to identify the transition (as stated by Applicant in the Remarks page 16), this is the same as the statement made in claim one of, "by using the image, the estimated foreground region and the estimated background region, calculating a transition region having a third set of pixels." Thus, the foreground and background are also used in the Applicant's claimed invention to decipher the transition region, which has a different set of pixels. The transition gaps in Wang are then

Art Unit: 2624

"processed" to remove the transition gaps and for improving image quality. Now the Examiner will take into account that the background and foreground are merged first before being subtracted from the original image (col. 9, lines 33-34), however, since this is a linear operation, the two regions would not need to be merged but subtracted (processed) individually one at a time to arrive at the same outcome and that this would be obvious to one of ordinary skill in the art. Thus, Wang teaches three separate regions (foreground, background, and transition), and to subtract or suppress said pixels to improve image quality.

### ***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

### **Contact**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL VANCHY JR whose telephone number is (571)270-1193. The examiner can normally be reached on Monday - Friday 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Supervisory Patent Examiner, Art Unit 2624

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